ABSTRACT OF THE DISCLOSURE

A shutter switch is disclosed the is placed in the path of a millimeter beam and is either opaque or transparent to the beam. The shutter switch comprises a number of waveguides placed adjacent to one another to intercept the beam, a portion of the beam passing through each waveguide. The dimensions of each waveguide are such that transmission of the respective portion of the beam would be cut-off if the all of the waveguide walls were conductive. However, the waveguides have high impedance structures on at least two of their opposing interior walls that allow the beam at the design frequency to be transmitted through the waveguide with uniform density and minimal attenuation. At this design frequency the shutter switch to be essentially transparent to the beam. The high impedance structures can also be changed to a conductive surfaces such that all of the waveguides walls appear conductive and the waveguide takes on the characteristics of a metal rectangular waveguide. In this state transmission through each waveguide is cut-off and the shutter switch blocks transmission of the beam. The shutter switch can change states from blocking to transparent in microseconds or less while consuming very little power.